Attack on plain and blended cements exposed to aggressive sulfate environments

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Abstract: The recent modifications in the cement manufacturing technology and the extensive use of mineral admixtures have introduced changes in the chemical and mineralogical composition of the present-day cements. These changes may significantly affect the durability of concrete, particularly the sulfate attack. Due to these modifications, the need for understanding the mechanisms of sulfate attack through laboratory and field exposure studies becomes all the more important. This paper reviews the studies conducted at King Fahd University of Petroleum and Minerals (KFUPM) to assess sulfate attack on plain and blended cements exposed to aggressive environments in the laboratory and the field. Based on this review, the mechanisms of sulfate attack are discussed. The effect of cation type associated with the sulfate anions on concrete deterioration due to sulfate attack and the role of chloride ions on sulfate attack in plain and blended cements are also elucidated.